UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

MEMORANDUM

DATE: DEC 12 2016

SUBJECT: **AMENDED ENFORCEMENT ACTION MEMORANDUM** - Request for Approval of a Change in Scope of Response Actions for the Non-Time Critical Removal Action at Zionsville Third Site
Zionsville, Boone County, Indiana
Site ID # 05HM

FROM: Matthew Ohl, Remedial Project Manager
Remedial Response Branch #1 - Section #1

THRU: Joan Tanaka, Chief 11.30.16
Remedial Response Branch #1

Samuel Borries, Chief
Emergency Response Branch #2

TO: Douglas Ballotti, Acting Director
Superfund Division

I. PURPOSE

The purpose of this Amended Enforcement Action Memorandum is to request and document your approval of a change in scope for the selected response action at the Zionsville Third Site (Site). The Site consists of approximately two acres of land located at 985 S. U.S. Highway 421, north of Zionsville, Boone County, Indiana. This proposed change in scope is to supplement the identified treatment technology for the area of the Site, containing high concentrations of dense non-aqueous phase liquids (DNAPLs) and volatile organic compounds (VOCs). Despite multiple applications to date, the original treatment technology (chemical oxidation) has not achieved cleanup standards, so that supplemental measures are necessary and appropriate. The potentially responsible parties (PRPs) propose Electrical Resistance Heating (ERH) to treat this area.

ERH is an in-situ treatment process that applies electrical current to the saturated and unsaturated contaminated zone using a network of electrodes and natural electrical resistance within the subsurface to generate heat near or above the boiling points of the targeted chemicals. As a

result, chemicals transition to the vapor phase and are stripped from the soils or degraded. A vapor extraction system then removes volatile chemicals for treatment at ground surface.

The original Enforcement Action Memorandum, dated May 11, 2001, documented the determination of an imminent and substantial threat to public health and the environment, and selected the non-time critical removal action for the Site. The Enforcement Action Memorandum described the removal actions necessary to address the threats posed by the presence of soil and groundwater contaminated with DNAPLs and VOCs at the Site. The removal action is ongoing and will mitigate threats to public health, welfare and the environment posed by the presence of soils that are contaminated with hazardous substances as defined pursuant to Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

EPA anticipates that PRPs will perform this supplemental removal action, which they have proposed pursuant to an Administrative Order on Consent signed on November 21, 2002, under an EPA-approved design and work plan and with EPA oversight. These response actions would mitigate the human health threats by treating the DNAPL source area to achieve the identified cleanup standards.

This Site is not on the National Priorities List (NPL), but is immediately adjacent to, and closely related to, the Envirochem Corp. Superfund Site. On September 8, 1983, EPA placed the Envirochem Corp. Site on the NPL.

II. SITE CONDITIONS AND BACKGROUND

SEMS ID: 0506324
RCRA ID: IND984876177
Category: Non-Time Critical Removal Action

A. Site Description

1. Physical Location and Description

Please refer to the original Enforcement Action Memorandum approved on May 11, 2001, attached to this Amended Enforcement Action Memorandum (see Attachment 1).

2. Site Background

Please refer to the original Enforcement Action Memorandum approved on May 11, 2001 (see Attachment 1).

3. Site Characteristics

Please refer to the original Enforcement Action Memorandum approved on May 11, 2001 (see Attachment 1). The primary areas of concern at the Site are the DNAPL area and two groundwater contamination plumes as shown on the attached Site maps (see Attachment 2). The response actions for all of these areas are ongoing. This Amended Enforcement Action Memorandum does not revise the selected response actions for the groundwater plumes.

B. Other Actions to Date

Please refer to the original Enforcement Action Memorandum approved on May 11, 2001 (see Attachment 1). Among other things, the Engineering Evaluation/Cost Analysis (EE/CA) investigation for the Site confirmed the presence of a concentrated area of DNAPL contamination in soil and groundwater that exceeded Maximum Contaminant Level (MCL) standards for drinking water and Indiana non-default soil standards necessary to avoid unacceptable impacts on groundwater. The DNAPL area extended over an estimated 4,500 square feet and to an estimated depth of up to 41 feet.

Under an Administrative Order on Consent signed on November 21, 2002, a group of PRPs has attempted to implement the removal actions identified and selected in the original Enforcement Action Memorandum, dated May 11, 2001. For the DNAPL area, those actions consisted of the following:

1) Treating and containing the DNAPL area by using a sealed sheet pile wall and then pumping out the interior to remove the bulk of the mobile DNAPL. Pumping included the dewatering of the portion of Bankert Pond within the containment area, and treatment of the water removed from the DNAPL area to meet Indiana discharge requirements.

2) Following the localized pumping and treating of water within the containment wall, injecting chemical oxidation agents into the DNAPL area to break down any remaining DNAPL and to meet the cleanup standard of at least 90% reduction in total VOC groundwater concentration within the containment wall from pre-response levels.

3) After meeting cleanup standards, installing a RCRA compliant cover to prevent further infiltration of rainwater and installing a gate containing a reactive media to provide treatment for any residual contamination that may later escape the containment area.

The stated objective of the selected response actions at the Site was to alleviate the potential and actual threats posed by contamination in the DNAPL area that exceeds MCLs and soil-to-groundwater standards.

The PRPs implemented the sheet pile wall and the localized pumping within the DNAPL area. Additional sampling provided baseline results against which to measure the ninety percent reduction in February 2005. In September 2005, contractors installed thirty one-inch diameter wells within the DNAPL area. Chemical treatment occurred in September and October of 2006. The treatment included injecting approximately 5,700 gallons of Fenton's Reagent, with about 3,950 gallons in 14 shallow wells and 1,750 gallons in 10 deeper wells. In November 2006, post-treatment groundwater samples showed total concentrations at levels approximately twice the cleanup standard of 4,285 micrograms/liter (ug/L) for total VOCs.

During July and August 2007, contractors injected a different chemical oxidant called RegenOx® into push-probe injection locations on eight-foot centers over a 2,400 square foot area. Samples collected in December 2007 appeared to show a reduction in VOC concentrations

compared to the concentration after the November 2006 initial treatment. However, post-injection samples showed levels were still above the cleanup standard for total VOCs.

In 2012 another effort at remediating the enclosed DNAPL area was made consisting of low flow pumping which continued until October 2012, followed by high flow pumping which continued until December 2012. The pumping removed a total of ninety-four thousand gallons of water with the recovery of approximately seven gallons of DNAPL. Additionally, in November 2012, contractors injected five hundred gallons of RegenOx® solution into the lower five feet of the collection well/sump with the purpose of treating the interior of the collection/sump and the sand packed/formation within the immediate vicinity of the collection well/sump.

From December 2012 until May 2013, the water levels recovered to pre-pumping conditions. In June 2013, sampling showed VOC concentrations ranging from 5,931.6 ug/L to 52,525 ug/L. Therefore, chemical treatment of the DNAPL containment area has still not reached the cleanup standards.

The PRPs had similar problems with the nearby Soil Vapor Extraction (SVE) Areas at the Site where SVE systems were unable to achieve cleanup standards. After repeated attempts to make system modifications and treat the soils, the PRPs proposed to remove the soils under the Additional Work provisions of the Administrative Order on Consent. In 2012 and 2013, the PRPs removed soils from the SVE areas and disposed of them off-site under an EPA-approved work plan.

Analysis conducted by the PRPs in 2014 and 2015 indicated that the failure of chemical oxidation to achieve the cleanup objective was due to site-specific conditions and that it was appropriate to consider alternative treatment methodologies to meet the cleanup objectives. In particular, it appeared that lower permeability areas within the DNAPL area had proved difficult to treat with chemical oxidation. A considerable amount of the DNAPL mass is associated with the upper clay/silt layers within the DNAPL containment area. This DNAPL may not be readily accessible to further injections of chemical oxidants.

Specifically, the PRPs proposed to use Electrical Resistive Heating (ERH), rather than further chemical oxidation or other alternatives, to achieve cleanup standards. The PRPs also proposed to remove the requirement of a RCRA cap and permeable vessel in the event ERH results demonstrated cleanup to levels well below the 90% reduction provided for in the original Enforcement Action Memorandum.

C. State and local Authorities' Roles

EPA is the lead federal Agency in partnership with the Indiana Department of Environmental Management and local government agencies.

III. THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The conditions at the Zionsville Third Site present an imminent and substantial threat to the public health, or welfare, and the environment, and meet the criteria for a non-time critical removal action as provided for in the National Contingency Plan (NCP) Section 300.415(b) (2). The Enforcement Action Memorandum signed on May 11, 2001 (see Attachment 1) documents the facts and conditions that meet these criteria and have not been fully resolved.

IV. ENDANGERMENT DETERMINATIONS

Given the Site conditions, the nature of the suspected hazardous substances on Site, and the potential exposure pathways described in Sections II and III above, actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response actions selected in the original Enforcement Action Memorandum and this Amended Enforcement Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Action

1. Proposed Action Description

The proposed supplemental removal action is to apply ERH treatment at the Site. The extent of ERH treatment would include the entire DNAPL containment area and nearby areas, to maximize reduction in total VOCs. Contractors would remove the existing sump and piezometers in the DNAPL area before initiating ERH to avoid damage, and replace them after the treatment concludes to allow measurement of its effectiveness.

The response actions described in this memorandum directly address the actual or threatened release at the Site of a hazardous substance, pollutant, or contaminant, which may pose an imminent and substantial endangerment to public health or welfare or to the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions addressed.

The minimum DNAPL area cleanup requirements remain the breakdown of any DNAPL and a 90% reduction in VOCs in groundwater as set forth in EPA's original Enforcement Action Memorandum. Multiple rounds of post-treatment sampling will be necessary to evaluate whether VOC concentrations in groundwater rebound. This will help assess whether ERH treatment achieves long-term compliance with cleanup standards. If ERH fails to achieve and maintain those requirements, additional measures will be required.

In proposing the ERH treatment approach, the PRPs identified studies suggesting that ERH could produce reductions in soil and groundwater concentrations as high as 95-99%. They further requested that EPA consider eliminating the provisions of the existing response action that require installing a RCRA cap and reactive vessel after meeting the treatment performance standards.

EPA required the cap and reactive vessel recognizing that residual, dissolved contamination may remain in place in the DNAPL area after treatment. The intent of the cap is to restrict infiltration to impede migration of any residual contamination into groundwater and to control hydraulic pressures within the containment area. Similarly, the reactive vessel protects groundwater from contamination that may escape containment. A proposal to remove these elements would need to show how the overall response measures would provide equivalent performance and long-term effectiveness and be consistent with the overall objectives. This may be of particular concern because of the possibility that an ERH remedy could affect the integrity of the containment wall seals.

Because the effectiveness of ERH is yet to be determined, it is premature to decide to remove elements of the selected response action. In the event post-rebound sampling indicates that contamination levels in the DNAPL area are maintained lower than the soil and groundwater cleanup standards established for the rest of the Site, EPA will consider whether to modify the requirements for the cap and/or reactive vessels. Otherwise, those elements will remain part of the selected response the PRPs must implement under the Administrative Order on Consent.

2. Contribution to Remedial Performance

EPA expects ERH treatment of the DNAPL area to help the cleanup of groundwater at the site by removing sources of groundwater contamination.

3. Engineering Evaluation/Cost Analysis (EE/CA)

Please refer to the original Enforcement Action Memorandum approved on May 11, 2001, attached to this Amended Enforcement Action Memorandum (see Attachment 1). After the June 2013 sampling showed that chemical oxidation treatments had still not met cleanup requirements, the PRPs evaluated several response action alternatives in addition to potential resumption of chemical oxidation. The range of alternatives included:

- In-Situ Chemical Reduction (ISCR) of the upper till unit, sand and gravel unit and portions of the lower till unit
- ERH of the upper till unit, the sand and gravel unit and portions of the lower till unit
- Combined steam-hot air injection with ISCR of the upper till unit, the sand/gravel unit and portions of the lower till unit

The PRPs screened out the first alternative in part because of complications associated with soil heaving and long remediation times (potentially two years). The third alternative also involved potential soil heaving and the estimated need for off-site disposal of one thousand tons of heaved soils. That left ERH as the preferred alternative to achieve cleanup objectives effectively in a reasonable period of time.

The selected supplemental non-time critical removal action represents the best combination of effectiveness, implementability and cost to address the DNAPL area. The Administrative Record (Attachment 3) provides a more detailed comparison of the alternatives that supports the selection of this removal action.

4. ARARs
The PRPs will comply with all Federal and State applicable, relevant, and appropriate requirements (ARARs) to the extent practicable. The PRPs will ensure that all hazardous substances, pollutants or contaminants removed off-site pursuant to this removal action for treatment, storage, and disposal will be treated, stored, or disposed of at a facility in compliance, as determined by EPA, with the EPA Off-Site Rule, 40 CFR 300.440.

5. Project Schedule
The PRPs expect the treatment to take about 12 months after completion of construction.

B. Estimated Costs

The PRPs estimate ERH to cost in the range of $2.5 million to $2.6 million.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Given the Site conditions, the nature of the hazardous substances and pollutants or contaminants documented on Site, and the potential exposure pathways to nearby populations described in Section II, III, and IV above, actual or threatened releases of hazardous substances and pollutants or contaminants from this Site, if not addressed by implementing the supplemental response actions selected in this Amended Enforcement Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment, increasing the potential that hazardous substances will be released, thereby threatening the environment and the health and welfare of nearby residents and other persons who are in proximity to the Site.

VII. OUTSTANDING POLICY ISSUES

None

VIII. ENFORCEMENT

EPA anticipates that the PRPs who have entered into the Administrative Order on Consent signed on November 21, 2002 will implement the activities described in this Amended Enforcement Action Memorandum.

In addition, EPA has planned for the provision of post-removal site control consistent with the provisions of Section 300.415(l) of the NCP. EPA anticipates that the PRPs will conduct any post-removal site control.

The supplemental response actions described herein may require conforming revisions to the Administrative Order on Consent and to the Work Plan and Design developed thereunder.

IX. RECOMMENDATIONS

This decision document presents the selected supplemental removal action for the Zionsville Third Site, located in Zionsville, Indiana. It was developed in accordance with CERLCA, as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record (Attachment 3) for the Site.

Conditions at the Site continue to meet the NCP Section 300.415(b)(2) criteria for a removal action and I recommend your approval of the proposed removal action. You may indicate your decision by signing below.

APPROVE:

Douglas Ballotti, Acting Director
Superfund Division

12/17/2016
Date

DISAPPROVE:

Douglas Ballotti, Acting Director
Superfund Division

Date

Attachments:
1. Enforcement Action Memorandum Signed May 11, 2001
2. Figures
3. Administrative Record Index

cc: B. Schlieger, EPA HQ
L. Nelson, U.S. Department of Interior, w/o Enf. Addendum

Attachment 1

Enforcement Action Memorandum

Signed May 11, 2001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

0000004

REPLY TO THE ATTENTION OF

MEMORANDUM

DATE: MAY 11 2001

SUBJECT: **ENFORCEMENT ACTION MEMORANDUM** - Determination of Threat to Public Health and the Environment and Selection of Non-Time Critical Removal Action at the Zionsville Third Site, Zionsville, Boone County, Indiana (05HM)

FROM: Michael McAteer, Remedial Project Manager
Remedial Response Branch

TO: William E. Muno, Director
Superfund Division

I. PURPOSE

The purpose of this memorandum is to document the determination of an imminent and substantial threat to public health and the environment, and the non-time critical removal action to be performed at the Zionsville Third Site in Zionsville, Indiana.

The selected removal action addresses the threats posed by the presence of soil and groundwater contaminated with dense non-aqueous phase liquids (DNAPLs) and with other volatile organic compounds (VOCs) at the Site, which consists of approximately two (2) acres of land near Zionsville, Indiana.

U.S. EPA anticipates that potentially responsible parties (PRPs) will perform this removal action pursuant to an Administrative Order. These response actions would mitigate the human health threats by treating the DNAPL source area and the other areas of soil and groundwater contamination.

This site is immediately adjacent to, and is closely related to, the Enviro-Chem Superfund Site. The Enviro-Chem Site was placed on the National Priorities List (NPL) on September 8, 1983.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID# IND 984259951

A. PHYSICAL LOCATION

Third Site (Figure 1) is a vacant tract of land located on property owned by Patricia Bankert, Boone Properties, and the Jonathan Bankert estate. The property is located approximately 150 feet east of U.S. Route 421 and approximately 300 feet south of the Enviro-Chem Superfund Site in Boone County, Indiana.

B. SITE DESCRIPTION AND BACKGROUND

Third Site occupies approximately two (2) acres of land in a largely rural area with some mixed commercial development. The nearest residence to the Site is located approximately 220 feet to the north. Site-related contamination extends approximately 75 feet west of U.S. Route 421. The Enviro-Chem Superfund Site is located approximately 300 feet to the north. The Northside Sanitary Landfill (NSL) Superfund Site is located approximately 350 feet to the east and northeast. The land west of Highway 421 is pastureland for a commercial horse breeding facility. The Site is located along north of Finley Creek and includes a man-made recreational pond used by a nearby residence for fishing and swimming. Finley Creek flows west from the Site and flows into Eagle Creek approximately one-half mile from the Site. Eagle Creek flows south from its confluence with Finley Creek for approximately 10 miles before emptying into Eagle Creek Reservoir. This reservoir supplies approximately six percent of the drinking water for the City of Indianapolis.

In Indiana, the low-income percentage is 29% and the minority percentage is 10%. To meet the Environmental Justice concern criteria the area within 1 mile of the site must have a population that's twice the state low income percentage and/or twice the state minority percentage. That is, the area must be at least 58% low-income and/or 20% minority. At this Site, the low-income percentage is .75% and the minority percentage is 16.7% as determined by Arcview or Landview III analysis. Therefore, this site does not meet the region's Environmental Justice criteria based on demographics as identified in Region 5 Interim Guidelines for Identifying and Addressing a Potential Environmental Justice Case, June 1998.

Historical aerial photographs of the Site area dating from 1950 to 1986 indicate the area was used for tank and drum storage and truck parking in the mid-to-late 1970s. Testimony from former Enviro-Chem employees and waste haulers indicate that waste handling and disposal at Third Site was a direct result of operations at the Enviro-Chem Site. Wastes disposed of at Third Site appear to be the same waste types and from the same commercial facilities as the wastes disposed of at the Enviro-Chem Site. The pond was reportedly created sometime after 1986

by excavating materials from the storage and parking area to build a berm around the southwestern, southern and southeastern sides of the pond and to regrade the area between the pond and Finley Creek.

The Third Site property is owned primarily by the Bankert family and its corporate entities, which is also true for the Enviro-Chem Superfund Site. Third Site is currently zoned I-2 (Industrial/Floodplain) and is expected to remain so. Access to Third Site is currently unrestricted.

In 1987 and 1992, a consultant for a group of the PRPs for the Enviro-Chem Superfund Site collected soil, groundwater, seepage soil and seepage water samples from the Third Site and confirmed volatile organic and semi-volatile organic contamination of soil in this area. In 1988, a consultant to U.S. EPA collected additional soil, groundwater and surface water samples from the Site and surrounding property. Soil sample results revealed elevated levels of VOCs such as tetrachloroethene (548,000 ug/kg), 1,1,1-trichloroethane (913,000 ug/kg), trichloroethene (3,310,000 ug/kg). Surface water sample results also revealed elevated levels of VOCs in the water adjacent to and immediately downstream of the Site. Total VOC levels in excess of 50 ug/l were detected in Finley Creek water samples adjacent to and immediately downstream of the area of known soil contamination. Samples collected from surface seeps discharging from the Site into Finley Creek revealed elevated levels of VOCs such as cis-1,2-dichloroethene (120,000 ug/l) and 1,1,1-trichloroethane (23,000 ug/l). Groundwater, which discharges from the Site into Finley Creek is also contaminated with elevated concentrations of VOCs and SVOCs such as 1,2-dichloroethene (35,000 ug/l), 1,1-dichloroethene (21,000 ug/l) and trichloroethene (11,000 ug/l).

Due to the potential for the soil contamination at or near the surface to migrate through wind dispersal and runoff or erosion into Finley Creek, a time-critical removal action was performed in June and July 1996 to realign a 40-foot oxbow section of Finley Creek away from the pond embankment.

In 1999 and 2000, a consultant for the PRPs collected samples of sediment, surface water, soil, and groundwater as part of the Engineering Evaluation/Cost Analysis (EE/CA) investigation. Sediment and surface water samples were collected from the pond, Finley Creek, and Unnamed Ditch bottoms. On October 24, 2000, U.S. EPA approved the final EE/CA Report summarizing current and historical data, evaluating risks, and assessing alternatives for removal actions to address unacceptable risks at the Site.

The EE/CA investigation results confirmed the presence of VOC contamination of surface water, sediment, soil and groundwater in the Third Site area and west of Highway 421.

The EE/CA investigation also confirmed the presence of a concentrated area of DNAPL contamination in soil and groundwater in the area of the berm south of the man-made pond. Contamination in the DNAPL area exceeds Maximum Contaminant Level (MCL) standards for drinking water and IDEM non-default soil standards necessary to avoid unacceptable impacts on groundwater. The DNAPL area extends over an estimated 4,500 square feet and to an estimated depth of up to 41 feet. In addition, groundwater contamination is present at levels above MCLs in two other areas outside the DNAPL area. One area of groundwater contamination extends downgradient from the DNAPL area. The other area is south of the NSL access road, upgradient from the DNAPL area, in an area where truck parking and container storage took place.

The EE/CA report concluded that levels of contamination in groundwater and the DNAPL area pose a threat to human health. Risk from ingestion of and dermal contact with contaminated groundwater exceed 10 X 10-4 excess lifetime cancer risk to human health and exceed the noncarcinogenic hazard quotient of one. In addition, the levels of VOC contamination in soil along the southern edge of the Bankert Pond (see attached figure) pose a risk of 1.9 x 10-5 excess lifetime cancer risk to human health from dermal contact and ingestion. This soil contamination, along with the DNAPL area, also acts as a continuous source of contamination to the surrounding groundwater.

VOCs identified as the contaminants of concern based on their occurrence in soil (measured in ug/kg) and/or groundwater (measured in ug/l), and their maximum concentrations are as follows: tetrachloroethene (330,000 ug/kg, 36 ug/l); trichloroethene (350,000 ug/kg, 870 ug/l); cis-1,2-dichloroethene (130,000 ug/kg, 29,000 ug/l); vinyl chloride (4,800 ug/kg, 860 ug/l); trans-1,2-dichloroethene (930 ug/kg, 100 ug/l); 1,1,1-trichloroethane (49,000 ug/kg, 5,800 ug/l); 1,1,2-trichloroethane (ND,12 ug/l); 1,1-dichloroethane (23,000 ug/kg, 780 ug/l); and 1,1-dichloroethene (100 ug/kg, 160 ug/l). Vinyl chloride was found in groundwater west of Highway 421 (390 ug/l).

A streamlined risk assessment, performed as part of the EE/CA, determined that the contamination at the Site did not pose an unacceptable ecological risk, and that the low levels of contamination found in the sediment and surface water samples did not pose a significant risk to human health.

C. OTHER ACTIONS TO DATE

As noted above, a group of the largest PRPs at the Site performed a relocation of Finley Creek in June and July, 1996. This work was performed under a Unilateral Administrative Order issued by U.S. EPA on March 22, 1996. U.S. EPA also issued a notice letter to all known PRPs on April 2, 1996.

The PRPs performed the EE/CA under an Administrative Order on Consent issued by U.S. EPA on June 6, 1999. After the EE/CA report was completed, on October 24, 2000, U.S. EPA issued a notice identifying its preferred non-time critical removal action for the Site and soliciting public comment on that proposed action.

The State of Indiana requested that the U.S. EPA take the lead role in addressing the risks posed by the Site. The State has consulted with U.S. EPA and has reviewed and commented on the submissions required under the U.S. EPA orders.

III. THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at Third Site present an imminent and substantial threat to human health, welfare, and the environment and meet the criteria for a removal action as stated in the National Contingency Plan (NCP), Section 300.415, Paragraph (b) (2), specifically:

b. **actual or potential contamination of drinking water supplies or sensitive ecosystems;** this factor is present at the Site due to the existence of groundwater that is contaminated with elevated concentrations of VOCs such as tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, vinyl chloride, trans-1,2-dichloroethene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and 1,1-dichloroethene above Indiana residential default groundwater protection criteria. Residential drinking water supply wells in the immediate vicinity of the site have not been effected by this groundwater but the potential exists for future impacts.

Further, contaminated groundwater is discharging into adjacent Finley Creek. Finley Creek is one of the tributaries which feeds into Eagle Creek Reservoir, which supplies approximately six percent of the drinking water for the City of Indianapolis. The potential for VOC contamination of the drinking supply by this source is low given the volatility of the contaminants and lengthy travel distance between the Site and the reservoir.

c. **the unavailability of other appropriate federal or state response mechanisms to respond to the release;** this factor supports the actions required by this Order at the Site because the State of Indiana currently does not have the available funds to respond to this non time-critical situation.

IV. ENDANGERMENT DETERMINATION

The actual or threatened release of hazardous substances from the Site as described in Sections II & III, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to the public health, or welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

V. PROPOSED ACTION AND ESTIMATED COSTS

The results of the supplemental investigation performed as part of the EE/CA are described in Section II above. The EE/CA Report identified a number of different options for addressing contamination at the Site.

After evaluating the EE/CA Report, on November 13, 2000, U.S. EPA issued a notice identifying its proposed cleanup measures for the Site and requesting public comment on the proposal. The public comments received and the Agency's responses are summarized in the attached responsiveness summary.

As a result of this process, U.S. EPA has selected a removal action for the Site. This action involves the treatment of the DNAPL area and of contamination in the soil and groundwater in other areas of the Site. The following work must be completed to alleviate the potential and actual threats to human health and the environment posed by the hazardous substances present at the Site:

a. Treat and contain the DNAPL area (approximately 4,500 square feet) by using a sealed sheet pile wall and then pumping out the interior to remove the bulk of the mobile DNAPL. The containment component of this action will minimize further leaching of contaminants into area groundwater by diverting groundwater flow around the contained area. Dewatering of the portion of Bankert Pond within the containment area will be required and the sheetpile joints will be sealed. The water removed from the DNAPL area will be treated by means sufficient to meet Indiana discharge requirements. The existing treatment systems at the adjacent Enviro-Chem Superfund site may be used for this purpose. Following the localized pump and treat within the containment wall, chemical oxidation will be initiated by injecting oxidizing agent(s) into the area to break down any remaining DNAPL. Also, a RCRA-

compliant cover will be installed to prevent further infiltration of rainwater and a gate containing a reactive media to treat groundwater from within the DNAPL area will be installed. The combination of these activities provides a more effective removal action than any of the activities would provide on their own. Design and construction of the DNAPL treatment and containment system is expected to take approximately 6 to 10 months. U.S. EPA currently estimates that the pump and treat system within the contained area would require approximately 2 to 6 months of operation in order to reach the cleanup goals. Further details regarding the planned approach for removing the DNAPL area can be found in Section 5.0 of the EE/CA.

b. Use Soil Vapor Extraction (SVE) to remove contaminants from the area of soil contamination (approximately .5 acres) in excess of the IDEM site-specific soil criteria for protection of residential groundwater. Soil sampling will be conducted prior to construction to determine the full extent of soils exceeding the criteria. The air and any water removed from the SVE system will be treated by means sufficient to meet Indiana emission and discharge requirements. The existing treatment systems at the adjacent Enviro-Chem Superfund site may be used for this purpose. It is estimated that the SVE system can be constructed in 6 to 10 months and will operate for approximately 6 to 12 months.

c. Install wells with pumps to remove sufficient groundwater to decrease contamination from the two groundwater plumes by a minimum of 90%. It is estimated that this level of reduction can be obtained over approximately 6 weeks of pumping at a rate of 15 gallons per minute. The removed groundwater will be treated in a system sufficient to meet Indiana requirements for direct discharge to Finley Creek. The existing treatment systems at the adjacent Enviro-Chem Superfund site may be used for this purpose.

The remaining contamination in groundwater would be addressed through monitored natural attenuation. In addition to continued sampling of existing wells, one or more new monitoring wells would be installed at the leading edge of Plume 1, midway between MW-18 and MW-25 (refer to as MW-27) to assure that Indiana default residential groundwater standards are met and maintained. It is estimated this process may take 10 years.

d. Place deed restrictions and other appropriate institutional controls on the involved properties (onsite and offsite) to prevent the use of groundwater in these areas and to preserve the integrity of the DNAPL-area cover.

e. Routinely sample the surface water and groundwater to ensure the removal of contaminants to action levels (see Section VI below). Surface water and groundwater samples will be collected quarterly during the operation and following cessation of the groundwater collection system until action levels are achieved. Sampling frequency may be reduced following cessation of collection system operation as appropriate based on trends determined from the quarterly monitoring events. Groundwater sampling will include the new well installed near the downgradient end of the plume (South of Finley Creek and West of Highway 421).

f. Establish appropriate Quality Assurance and Quality Control programs to assure the accuracy and reliability of sampling data used to further define the contaminated areas and to assess progress and compliance with cleanup standards.

U.S. EPA estimates that this removal action will cost in the range of approximately $3.1 to $6.6 million and take approximately 6 to 10 months to construct. In addition, to the construction of the removal the PRPs have agreed to operate and monitor to ensure cleanup levels are met and maintained. Because the cost estimates used in the EE/CA Report excluded several contingencies (such as certain costs of access, institutional controls and groundwater treatment), it is likely that actual costs will be near the high end of that estimated cost range. These technologies are readily available, administratively feasible, and have performed effectively at other sites.

The response actions described in this Memorandum directly address actual or threatened releases of hazardous substances, pollutants, or contaminants at the facilities in the affected area that may pose an imminent and substantial endangerment to public health and the environment. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed.

All applicable or relevant and appropriate requirements (ARARs), including those specifically identified in the EE/CA Report, will be complied with to the extent practicable. Several of these ARARs are described specifically in Section VI below. The removal actions will also include planning for the provision of

post-removal site control, consistent with the provisions of Section 300.415 of the NCP. This is the final phase of work expected to be completed to specifically address the DNAPL area, and the other contaminated soils and groundwater at Third Site.

The other removal alternatives considered for the Site are described in detail in the EE/CA Report. They included:

1) for the DNAPL area - institutional controls; containment; chemical oxidation; localized pump and treat; excavation and low temperature thermal desorption; and chemical oxidation facilitated by containment, dewatering and capping.

2) for the contaminated soils: excavation and off-site disposal; and soil vapor extraction.

3) for groundwater plume 1: monitored natural attenuation; treatment wall; focused pump and treat; and long-term pump and treat.

4) for groundwater plume 2: monitored natural attenuation; phytoremediation; focused pump and treat; and long-term pump and treat.

The selected non-time critical removal action represents the best combination of effectiveness, implementability and cost to address the DNAPL area, contaminated soils, and contaminated groundwater at the Site. The EE/CA Report provides a more detailed comparison of the alternatives that supports the selection of this removal action.

VI. ACTION LEVEL STANDARDS AND ARARs

This section presents the action levels to be used for determining compliance with the cleanup objectives for DNAPL, soil, groundwater, and surface water at Third Site. The action levels are summarized in Table 1.

a. **DNAPL Area, following containment and chemical oxidation**: Within the containment wall, achieve a minimum 90% reduction in total VOC groundwater concentration from current levels in monitoring wells MW-19A and MW-19B. In a monitoring well immediately outside the containment wall gate, meet 230 ug/l total VOCs (10% of the current MW-22 total VOC concentration of 2,328 ug/l).

b. **Vadose Zone Soil, following SVE**: Achieve IDEM residential groundwater protection non-default site-specific soil criteria based on the Summers model.

c. **Groundwater, following focused pump and treat**: Achieve residential default criteria **or** 90% reduction in total VOCs at each target area monitoring well (MW-17, MW-20, MW-22, MW-24, MW-25, MW-26 and MW-27). Examples: MW-22 VOCs reduced from 2,328 ug/l to 233 ug/l and MW-25 VOCs reduced from 454 ug/l to 45 ug/l.

d. **Groundwater, following natural attenuation:** Achieve Indiana residential default criteria for the VOC contaminants of concern identified in the EE/CA Report in all areas of the plumes outside the DNAPL area. Groundwater monitoring will continue until criteria are met.

e. **Surface Water:** Achieve action levels that are based on the lower of human health and ecological criteria.

All handling of contaminated soil on-site will comply with the requirements of RCRA, including regulations applicable to generators and transporters of hazardous wastes under 40 CFR Parts 241, 261, 262, 263 and 268 and 329 Indiana Administrative Code § 3.1 Rules 6, 7 and 10; regulations applicable to solid and special waste under 329 IAC §§ 10 and 11; and facility management standards under 40 CFR Part 264 and 329 IAC § 3.1 Rule 10. The Risk Integrated System of Closure (RISC) guidance describes the application of RCRA closure standards in the State of Indiana under 329 IAC § 3.1 Rule 10.

All emissions of volatile and fugitive emissions generated on-site during the removal action will comply with the substantive requirements of the Clean Air Act, including hazardous air pollutant standards and fugitive dust emission standards under 326 IAC and air quality standards under 40 CFR Part 50.

Any on-site discharges of treated groundwater will comply with the substantive requirements of the Clean Water Act, including water quality standards under 327 IAC §§ 2-1-7 and 2-1-1.5 and stormwater management requirements under 327 IAC 15-5.

Groundwater outside of the DNAPL area will comply with MCLs established under the Safe Drinking Water Act and with Indiana default residential criteria under the RISC. Soils outside the DNAPL area will comply with Indiana non-default residential criteria under the RISC.

TABLE 1
Action Levels for Soil, Groundwater, and Surface Water for Third Site Non-Time Critical Removal Action
Third Site, Zionsville, Indiana

Contaminants of Concern	Soil Action Levels[a] - Post SVE (ug/kg)	Groundwater Action Levels[b] - Post Natural Attenuation (ug/l)	Surface Water Action Levels[c] (ug/l)
1,1-dichloroethane	23,249	990	-
1,1-dichloroethene	287	7	3.2
cis-1,2-dichloroethene	1,740	70	-
trans-1,2-dichloroethene[d]	3,285	100	1,350
tetrachloroethene	386	5	8.85
1,1,1-trichloroethane[d]	11,636	200	528
1,1,2-trichloroethane	-	5	42
trichloroethene	402	5	81
vinyl chloride[e]	43	2	20

a. IDEM non-default site-specific soil criteria for protection of residential groundwater (based on Summers model)
b. IDEM default residential groundwater criteria
c. National Recommended Water Quality Criteria; Notice. Federal Register, Monday December 7, 1998.
d. For surface water value, EPA Region 4 Ecological Risk Assessment Bulletins–Supplement to RAGS, August 11, 1999
e. For surface water value, Indiana – Point of Water Intake

VII. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delay or inaction may result in increased likelihood of a release of VOC contaminants of concern into Finley Creek or into private water supply wells as the groundwater plume expands. Finley Creek discharges into Eagle Creek that flows into a reservoir used as a potable water source for the City of Indianapolis.

Construction of this removal action is expected to take approximately 6 to 10 months to complete and 3 years to operate. It is also expected to take 10 years to conclude monitored natural attenuation.

VIII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with this Site.

IX. ENFORCEMENT

The PRPs at this Site are identified, and U.S. EPA expects that they can and will perform the selected response actions properly and promptly.

X. RECOMMENDATION

This decision document represents the selected removal action for the Third Site located in Zionsville, Boone County, Indiana, developed in accordance with CERCLA, as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record for this Site. Conditions at the Site meet the NCP Section 300.415 (b) (2) criteria for a removal action. You may indicate your decision by signing below.

APPROVE: _____ DATE: 5/11/01
Director
Superfund Division

DISAPPROVE: _____ DATE: _____
Director
Superfund Division

Attachments: A. Site Figure
B. Administrative Record

cc: E. Watkins, U.S. EPA HQ, 5202G
D. Henne, U.S. Department of Interior
Myron Waters, Indiana Dept. of Environmental Management
100 North Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015

Responsiveness Summary

During the 30 day public comment period, which ran from November 13 to December 13, 2000, U.S. EPA sought input from the public on the proposed plan for the non-time critical removal action at Third Site. U.S. EPA received one comment, in written form, from the Third Site Trust Fund Trustees dated December 13, 2000. U.S. EPA also received three e-mail questions from local residents regarding groundwater quality.

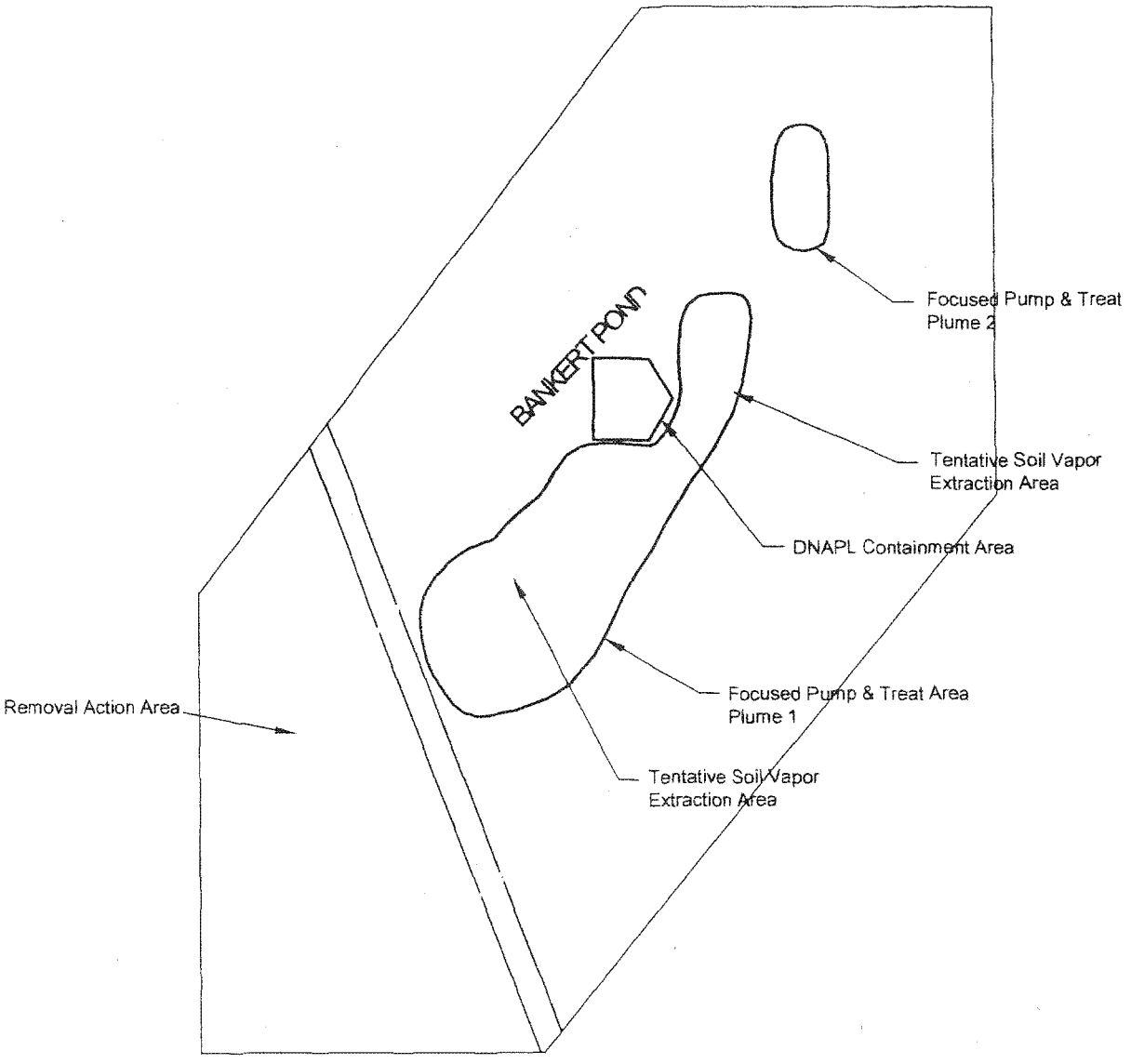
Comment: The written comment from the Third Site Trustees related to the removal cost estimate cited by U.S. EPA in the proposed plan. The commentors noted that this estimate may likely be an underestimate of actual costs. The reasons cited for the possible underestimation included the fact that there is no estimate at the present time for deed restrictions, access agreements, cooperative agreements for waste water treatment, possible additional investigations of groundwater contamination source areas, winterization of water lines, and possible extended monitoring periods for natural attenuation of groundwater. For these reasons, the commentors believe that the projected cost for the removal action will likely be closer to $6 million.

U.S. EPA Response: Based upon the Engineering Evaluation/Cost Analysis (EE/CA), U.S. EPA estimated the total removal cost to be approximately $4.5 million. This estimate was arrived at by adding the estimated costs for each subtask for the proposed removal action (i.e., cost for soil vapor extraction plus cost for groundwater pump and treat, etc.). The EE/CA also estimated the cost of the removal action at $4.4 million, however, as with all cost estimations under Superfund, a range is used (50% increase or 30% decrease). The range, listed as a footnote in the EE/CA, is therefore $3.1 million to $6.6 million. U.S. EPA agrees with the commentors that the cost estimate of $4.5 million may be an underestimation based upon the factors cited by the commentors. There is a high likelihood that the actual cost for implementation of this removal action will be at the higher end of the range.

Questions/Comments from Local Residents: Three separate e-mail messages were received by U.S. EPA during the public comment period. All three messages asked U.S. EPA for clarification on the extent of groundwater contamination in the vicinity of the Third Site. The concern represented in each comment related directly to possible contamination of private drinking water wells and whether or not U.S. EPA intended to sample private residential wells or install an alternate drinking water supply.

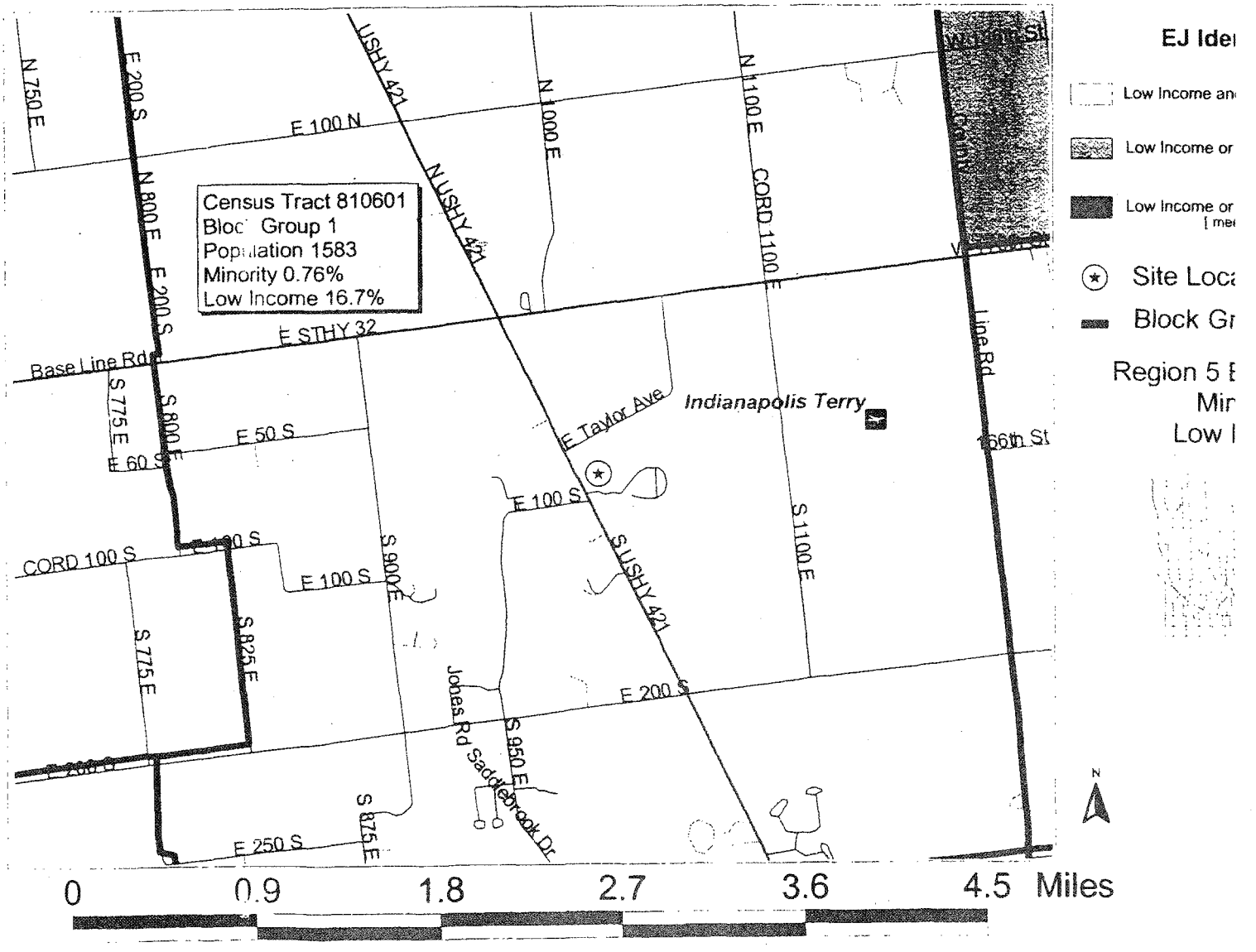
U.S. EPA Response: U.S. EPA also responded via e-mail to each of the three commentors. U.S. EPA clarified that the area of

groundwater contamination emanating from Third Site does not extend more than a few hundred feet west of U.S. Highway 421 and therefore has not affected any residential wells. The nearest downgradient residential wells are located approximately 300 feet south of Finley Creek and approximately 1,500 feet southwest of Third Site. U.S. EPA further clarified that residential wells nearest to the Site were sampled during the pre-EE/CA investigation phase and none showed any organic or inorganic contamination. As a result, there is no need to include further residential well sampling or an alternate water supply as components of the proposed removal action at Third Site. U.S. EPA also noted that the proposed remedy included the construction of a focused pump and treat system that would control further migration of the groundwater plume and thereby eliminate any potential risk of nearby residential well contamination.


BANKERT POND
Focused Pump & Treat
Plume 2
Tentative Soil Vapor
Extraction Area
DNAPL Containment Area
Focused Pump & Treat Area
Plume 1
Tentative Soil Vapor
Extraction Area
Removal Action Area

Region 5 Superfund EJ An

Third Site Union Township,I



ATTACHMENT B

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
THIRD SITE
ZIONSVILLE, INDIANA

ORIGINAL
MARCH 19, 1996

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	06/00/87	U.S. EPA		Eleven Aerial Photographs of the Northside Sanitary Landfill and Enviro-Chem Sites from 1950, 1955, 1962, 1972, 1978, 1980, 1982, 1983 and 1987	11
2	07/27/87	Environmental Resources Management-North Central, Inc.	U.S. EPA	Soil Boring Investigation in the Vicinity of Finley Creek	8
3	10/13/88	Maxwell, E., U. S. EPA	Addressees	Letter re: U.S. EPA's Conclusions Concerning Contamination at the Third Site	2
4	11/09/88	CH2M Hill	U.S. EPA	Technical Memorandum No. 2: Geotechnical, Hydro-geological and Supplemental Predesign Investigation for the Northside Sanitary Landfill/Environmental Conservation and Chemical Corporation Site	336
5	12/11/89	Environmental Resources Management-North Central, Inc.	U.S. EPA	Environmental Review for the Third Site	31
6	04/00/90	Environmental Resources Management-North Central, Inc.	U.S. EPA	Depth Determination of Fishing Pond for the Third Site	25

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
7	03/12/96	ERM-EnviroClean-North Central, Inc.	U.S. EPA	Creek Realignment Project for the Third Site	33
			UPDATE #1 MAY, 1996		
1	03/22/96	Muno, W. U.S. EPA	Respondents	Unilateral Administrative Order w/Cover Letter	23
2	04/02/96	Karl, R., U.S. EPA	Respondents	Letter re: General Notice of Potential Liability	4
			UPDATE #2 SEPTEMBER, 1996		
1	09/16/96	McAteer, M. U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health and the Environment at the Third Site, Zionsville, IN	11
			ADDENDUM JUNE 16, 1998		
1	04/30/98	Muno, W. and G., Ginsberg; U.S. EPA	Ullrich, D., U.S. EPA	Memorandum re: Administrative Order Compliance Status and Closure	21
			UPDATE #3 OCTOBER 15, 1999		
NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	9/00/99	ENVIRON International Corporation	U.S. EPA	Engineering Evaluation/ Cost Analysis Field Investigation Sampling Plan (Revision 1) for the Third Site	429
			UPDATE #4 FEBRUARY 18, 2000		
1	1/00/00	ENVIRON International Corporation	U.S. EPA	Field Investigation Data Report for Third Site, Zionsville, Indiana	195

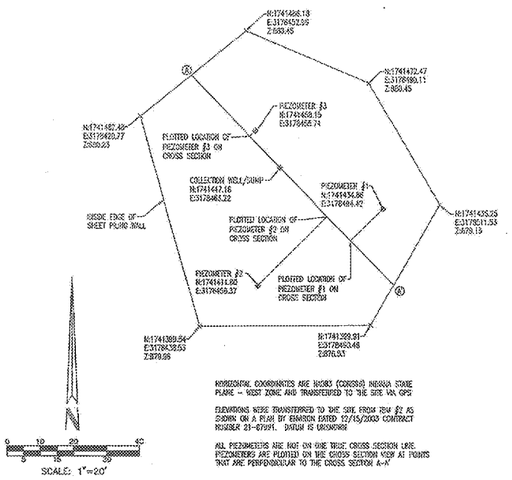
NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
			UPDATE #5 APRIL 9, 2001		
1	04/06/01	McAteer, M., U.S. EPA	File	Memorandum re: Methodology for Determining Action Levels at Third Site	3
2	00/00/00	McAteer, M., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health and the Environment and Selection of Non-Time Critical Removal Action at the Zionsville Third Site (PENDING)	

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
			UPDATE #5 APRIL 25, 2001		
1	10/10/00	ENVIRON International Corporation	U.S. EPA	Engineering Evaluation/ Cost Analysis (Revision 2) for the Third Site	481
2	10/24/00	McAteer, M., U.S. EPA	Ball, R., ENVIRON International Corporation	Letter re: U.S. EPA's Approval of the October 10, 2000 EE/CA for the Third Site	1
3	04/06/01	McAteer, M., U.S. EPA	File	Memorandum re: Methodology for Determining Action Levels at Third Site	3
4	00/00/00	McAteer, M., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health and the Environment and Selection of Non-Time Critical Removal Action at the Zionsville Third Site **(PENDING)**	

Attachment 2

Figures

PLAN VIEW



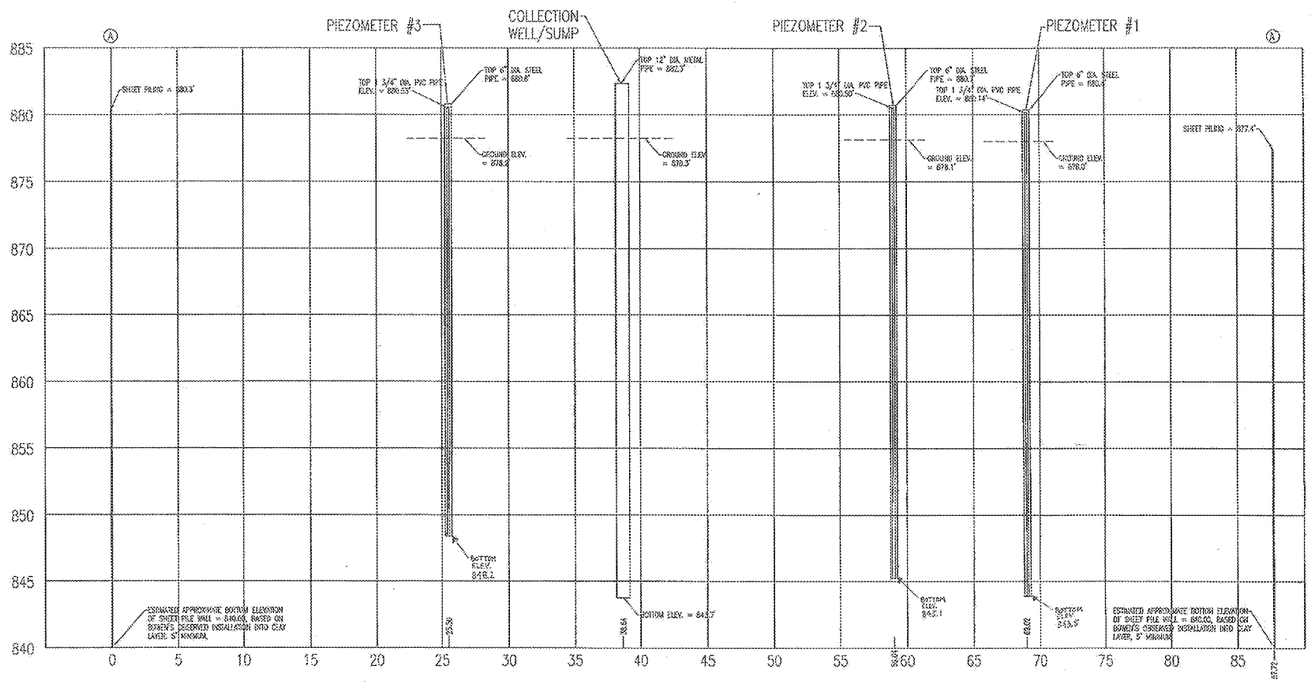
HORIZONTAL COORDINATES ARE NAD83 (CORS96) INDIANA STATE PLANE – WEST ZONE AND TRANSFERRED TO THE SITE VIA GPS

ELEVATIONS WERE TRANSFERRED TO THE SITE FROM JSH #2 AS SHOWN ON A PLAN BY EMMISON DATED 12/15/2003 CONTRACT NUMBER 21-07291. DATUM IS UNKNOWN

ALL PIEZOMETERS ARE NOT ON ONE TRUE CROSS SECTION LINE. PIEZOMETERS ARE PLOTTED ON THE CROSS SECTION VIEW AT POINTS THAT ARE PERPENDICULAR TO THE CROSS SECTION A-A'

CROSS SECTION A-A'

HORIZONTAL SCALE 1"= 5'
VERTICAL SCALE 1"= 5'



Drawn By: PEK	Approved By:
Checked By:	Approved By:
Submitted By:	
Date:	Date: 3/19/2008

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ARCHITECTURE
ENGINEERING/ENVIRONMENTAL SERVICES
LAND PLANNING
LAND SURVEYING
GIS

Index		
No.	Date	Revision

PIEZOMETER AS-BUILT
Boone County-Zionsville Third Site

Bowen Engineering
10315 Allisonville Road
Fishers, IN 46038
PHONE (317) 842-2074
FAX: (317) 841-4787

State:	IN
County:	BOONE
Township:	UNION
Range:	2-E
Section:	11
Quarter:	1/8-N
Scale:	1" = 20'
Sheet No:	1
Project Number:	080336-30000

MW-25R	11/16/12	5/20/14	8/26/14	12/17/14	3/5/15	6/9/15
1,1-DCA	65 / 65	19.5	10.8	<5	2.4	5.9
1,1-DCE	0.25J / 0.22J	<5	<5	<5	<1	<1
cis-1,2-DCE	31 / 30	<5	<5	<5	<1	<1
trans-1,2-DCE	1.2 / 1.2	<5	<5	<5	<1	<1
1,1,1-TCA	20 / 20	<5	<5	<5	<1	<1
TCE	1.4 / 1.4	<5	<5	<5	<1	<1
VC	**47 / 47**	<2	<2	<2	<1	<1
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**243 /243**	**139.3**	**117.6**	**84.8**	**69.2**	**74.3**
P&T Shutdown	45.4					

MW-20	8/30/12	5/21/14	8/27/14	12/17/14	3/4/15	6/10/15
1,1-DCA	230	484 J	118	174	436	237
1,1-DCE	<13	<5	<5	<5	<5	1.2
cis-1,2-DCE	**360**	**1,310 J**	**128**	**463**	**1,260**	**988**
trans-1,2-DCE	2.2 J	42.7	<5	8.8	44.8	36.3
1,1,1-TCA	< 13	20.2	<5	6.2	14.8	16.3 J
TCE	< 13	**18.3**	<5	<5	**11.5**	**9.9**
VC	**580**	**428 J**	**400**	**238**	**348**	**258**
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**1,239**	**2,344.2**	**720.5**	**920.6**	**2,154.8**	**1,628.2**
P&T Shutdown	232.8					

MW-22	8/30/12	5/20/14	8/26/14	12/16/14	3/4/15	6/10/15
1,1-DCA	670	125	74.9	45.6	17.6	14.6
cis-1,2-DCE	**7,100 J**	**1,850 J**	**954**	**744**	**493**	**302**
trans-1,2-DCE	**140**	45.8	34.6	27.9	15.9	11.4
VC	**130**	**12.9 J**	**11.1**	**5.3**	**4.9**	**5.1**
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**8,159**	**1,763**	**1,113.8**	**807.8**	563.7	350.9
P&T Shutdown	630.5					

EW-5	6/10/15
1,1-DCA	35.2
cis-1,2-DCE	**686**
trans-1,2-DCE	13.8
VC	**118**
All other COCs	ND

EW-1	6/10/15
1,1-DCA	61.9
cis-1,2-DCE	**945**
trans-1,2-DCE	24.1
VC	**134**
All other COCs	ND

MW-29	8/28/12	5/20/14	8/25/14	12/16/14	3/4/15	6/9/15	* 7/16/15
1,1-DCA	2.7	<5	<5	<5	<1	<1	<5
cis-1,2-DCE	3.3	<5	<5	<5	1.8	<1	<5
trans-1,2-DCE	0.35 J	<5	<5	<5	<1	<1	<5
VC	**53**	**12.8**	**7.4**	**4.9**	1.8	<1	<2
All other COCs	ND	ND	ND	ND	ND	ND	ND
Total VOCs	**89.7**	**12.8**	**14**	**16.7**	3.6	0	0
P&T Shutdown	9						

MW-28	8/28/12	5/20/14	8/25/14	12/16/14	3/6/15	6/9/15
VC	**16**	**42.3**	**42**	**42.4**	**40.4**	**56.6**
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**31.9**	**42.3**	**48.4**	**42.4**	**43.6**	**70**
P&T Shutdown	3.2					

MW-30	5/19/14	8/25/14	12/16/15	3/6/15	6/9/15
All COCs	ND	ND	ND	ND	ND
Total VOCs	0	0	0	0	0

EW-2	6/10/15
1,1-DCA	12.8
cis-1,2-DCE	**76.2**
VC	**39.6**
All other COCs	ND

MW-26	11/15/12	5/21/14	8/26/14	12/17/14	3/4/15	6/9/15
1,1-DCA	57	<5	17.9	17.6	24.9	5.5
1,1-DCE	0.62 J	<5	<5	<5	2.2	<1
cis-1,2-DCE	**170**	<5	14.7	<5	10.1	3.4
trans-1,2-DCE	3.5	<5	<5	<5	<1	<1
PCE	0.12 J	<5	<5	<5	<1	<1
1,1,1-TCA	57	<5	12.1	19.0	27.2	<1
TCE	0.11 J	<5	<5	<5	<1	<1
VC	**140**	<2	**12.7**	**2.5**	**5.3**	**3.7**
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**655**	18.1	**137.4**	**95.2**	**121.9**	23.8
P&T Shutdown	37.9					

MW-27	11/15/12	5/20/14	8/26/14	12/17/14	3/5/15	6/10/15
1,1-DCA	3.4	<5	9.1	11.8	8.3	7.1
cis-1,2-DCE	38	36.4	**90.3**	**112**	**74.8**	**72.4**
trans-1,2-DCE	0.084J	<5	<5	<5	<1	<1
VC	**82**	**82.4**	**88**	**76.6**	**63**	**78.5**
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**136.6**	**107**	**211.8**	**205.4**	**162.5**	**169.2**
P&T Shutdown	23.5					

MW-27R	11/15/12	5/21/14	8/27/14	12/17/14	3/5/15	6/10/15
1,1-DCA	890	586 / 603	135 / 140	407 / 447	401 / 417	357 / 343
1,1-DCE	5.9	<25 / **11.3**	<5 / <5	6.7 / 6.5	20.6 / 26.7	9.1 / 8.6
cis-1,2-DCE	**5,200**	**4,520 J / 4,730 J**	**536 / 556**	**2,460 / 2,700**	**3,150 / 2,880**	**2,590 / 2,680**
trans-1,2-DCE	67	**170 / 186**	7.1 / 7.6	**108 / 105**	**160 / 159**	**151 / 143**
PCE	0.12 J	<25 / <5	<5 / <5	<5 / <5	<5 / <5	<1 / <1
1,1,1-TCA	87	**244 / 250**	32 / 32.4	192 / 193	190 / 196	**202 J / 274 J**
1,1,2-TCA	0.29 J	<25 / <5	<5 / <5	<5 / <5	<5 / <5	<1 / <1
TCE	**5.5**	<25 / <5	<5 / <5	<5 / <5	<5 / <5	2.3 / 2.1
VC	**2,000**	**1,060 / 1,050 J**	**454 / 447**	**642 / 702**	**544 / 594**	**585 / 557**
Total VOCs	**9,884**	**7,791 / 8,050**	**1,870 / 1,648**	**4,889 / 5,445**	**5,392 / 5,253**	**4,746 / 4,784**
P&T Shutdown	988.4					

EW-3	6/10/15
1,1-DCA	44.4
1,1-DCE	1.2
cis-1,2-DCE	**245**
trans-1,2-DCE	1.1
1,1,1-TCA	149
VC	**111**
All other COCs	ND

MW-24	11/16/12	5/21/14	8/26/14	12/17/14	3/5/15	6/10/15
1,1-DCA	36	10.8	<5	<5	1.6	3.0
1,1-DCE	0.33 J	<5	<5	<5	<1	<1
cis-1,2-DCE	68	14.6	<5	<5	4.6	2.1
trans-1,2-DCE	0.96	<5	<5	<5	<1	<1
1,1,1-TCA	30	11.9	<5	<5	<1	<1
TCE	0.33 J	<5	<5	<5	<1	<1
VC	**93**	<2	<2	<2	<1	1.1
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**316.5**	89.7	59.5	18.5	18.2	58.8
P&T Shutdown	164.9					

MW-23	11/16/12	5/21/14	8/26/14	12/16/14	3/4/15	6/10/15
1,1-DCA	6.2	10.3	15.8	9.6	7.4	6.6
1,1-DCE	0.23 J	<5	<5	<5	<1	<1
cis-1,2-DCE	**690**	**757**	**400**	**171**	**138**	**111**
trans-1,2-DCE	1.5	<5	<5	<5	<1	<1
VC	**1,100**	**645**	**424**	**43.9**	**25.5**	**79.4**
All other COCs	ND	ND	ND	ND	ND	ND
Total VOCs	**2,998.5**	**1,806.3**	**930.9**	**235.4**	**170.5**	**221.4**
P&T Shutdown	6.3					

EW-4	6/10/15
1,1-DCA	63.1
cis-1,2-DCE	**72.9**
trans-1,2-DCE	2.7
1,1,1-TCA	22.7
VC	**64.4**
All other COCs	ND

TPZ-1	7/16/15
VC	**14.9**
All other COCs	ND

TPZ-2	7/16/15
VC	**13.0**
All other COCs	ND

DNAPL CONTAINMENT AREA
BANKERT POND
FINLEY CREEK
POND OUTFALL PIPE
UNNAMED DITCH
U.S. HWY 421
BRIDGE WING WALL
MW-21
MW-15
MW-26
EW-2
MW-17
MW-16
MW-19A
MW-19B
MW-27R
NSL12
SW4
EW-3
MW-25R
MW-24
EW-4
SW3
MW-22
MW-20
SW2
EW-1
MW-23
EW-5
MW-29
SW1
MW-28
TPZ-2
TPZ-1
MW-30

LEGEND

- EXISTING MONITORING WELL
- MONITORING WELL (PROPERLY ABANDONED)
- SURFACE WATER SAMPLE LOCATION
- EXTRACTION WELL LOCATION
- PIEZOMETER LOCATION
- MANHOLE
- UNDERGROUND DRAIN PIPE
- DITCH/STREAM
- PROPERTY BOUNDARY
- THIRD SITE AREA
- UNDERGROUND TELEPHONE LINE
- OVERHEAD ELECTRIC LINE
- SMALL YARD LIGHT
- TREES/WOODED AREA
- PLUME 1
- PLUME 2

GROUNDWATER ACTION LEVELS	
1,1-DCA	990
1,1-DCE	7
cis-1,2-DCE	70
trans-1,2-DCE	100
PCE	5
1,1,1-TCA	200
1,1,2-TCA	5
TCE	5
VC	2

BENCHMARKS

TBM #1: EASTING = 725828.61; NORTHING = 921017.75; ELEVATION = 875.55

TBM #2: EASTING = 725819.51; NORTHING = 921496.72; ELEVATION = 881.95

NOTES:

1. DRAWING DEPICTS ALL PRE-REMOVAL ACTION SITE FEATURES.
2. ALL RESULTS REPORTED IN MICROGRAMS PER LITER (µg/L).
3. J = ESTIMATED CONCENTRATION
4. ND = NOT DETECT
5. GROUNDWATER ACTION LEVELS (GALs) FROM THE *ENFORCEMENT ACTION MEMORANDUM* DATED MAY 11, 2001; EQUIVALENT TO MCL/IDEM TIER I DEFAULT CRITERIA OF TABLE 2-7-C OF THE EE/CA.
6. * RESAMPLE COLLECTED TWO FEET ABOVE THE BOTTOM OF THE SCREEN.
7. PUMP AND TREAT (P&T) SHUT DOWN CRITERIA FROM TABLE 4 OF THE MARCH 2004 DESIGN REPORT. FOR MW-27, MW-28, AND MW-29, SHUT DOWN CRITERIA REPRESENT 10% OF TOTAL VOCS FROM THE 2012 SAMPLING EVENT.

APPROX. SCALE (ft.)
0 150

GROUNDWATER ANALYTICAL RESULTS MAP

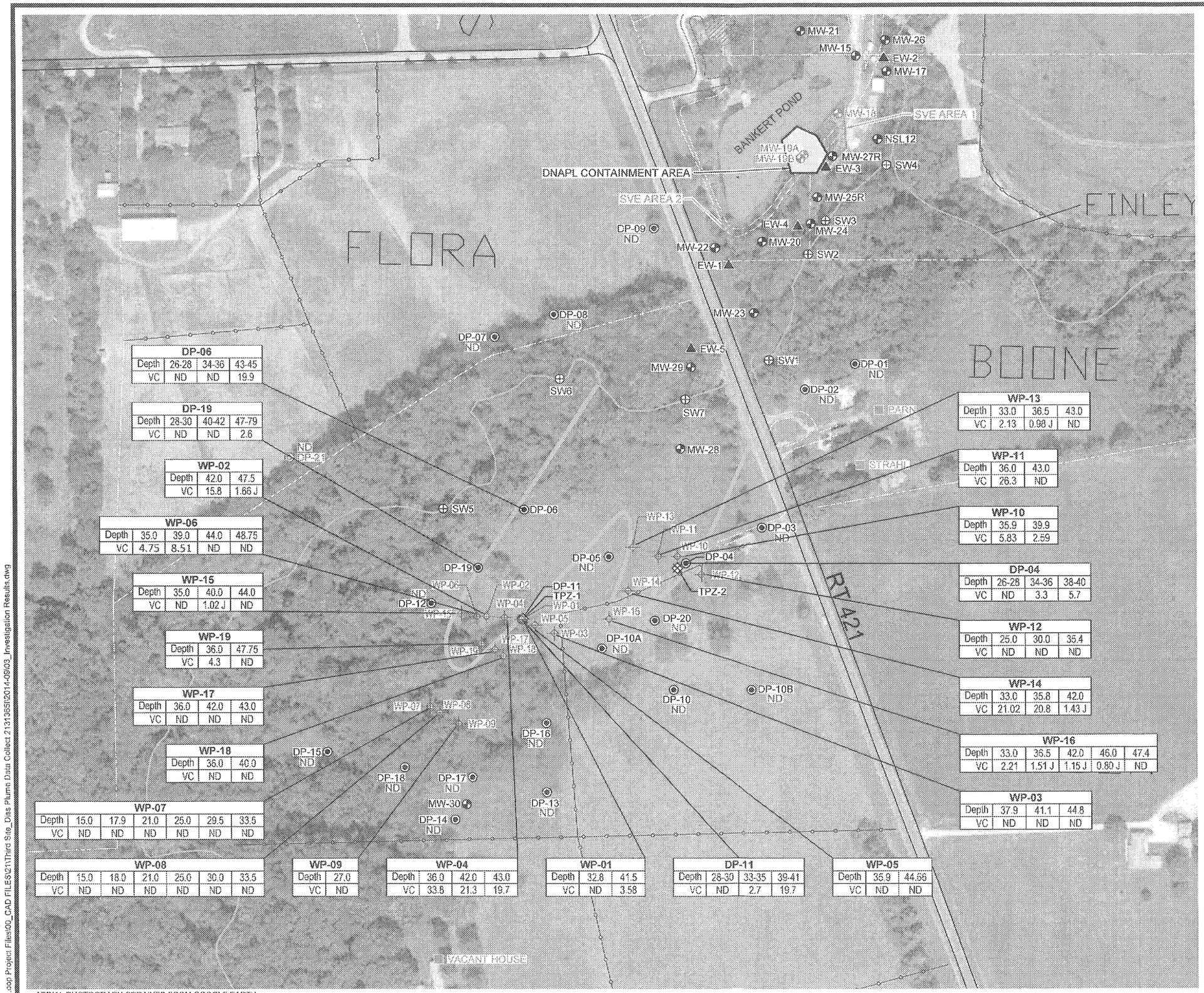
THIRD SITE
985 SOUTH U.S. HIGHWAY 421
ZIONSVILLE, INDIANA

RAMBOLL ENVIRON

FIGURE 2

DRAFTED BY: CKL/APR | DATE: 7/28/15 | 2131365J

C:\Users\arodriguez.ENVIRONCORP\Desktop\Projects\211Third Site_GW and SW Monitoring 2131365J\2015-07\072808_GW Analytical Results Map.dwg



DP-06			
Depth	26-28	34-36	43-45
VC	ND	ND	19.9

DP-19			
Depth	28-30	40-42	47-79
VC	ND	ND	2.6

WP-02		
Depth	42.0	47.5
VC	15.8	1.66 J

WP-06				
Depth	35.0	39.0	44.0	48.75
VC	4.75	8.51	ND	ND

WP-15			
Depth	35.0	40.0	44.0
VC	ND	1.02 J	ND

WP-19		
Depth	36.0	47.75
VC	4.3	ND

WP-17			
Depth	36.0	42.0	43.0
VC	ND	ND	ND

WP-18		
Depth	36.0	40.0
VC	ND	ND

WP-07						
Depth	15.0	17.9	21.0	25.0	29.5	33.5
VC	ND	ND	ND	ND	ND	ND

WP-08						
Depth	15.0	18.0	21.0	25.0	30.0	33.5
VC	ND	ND	ND	ND	ND	ND

WP-09		
Depth	27.0	
VC	ND	

WP-04			
Depth	36.0	42.0	43.0
VC	33.8	21.3	19.7

WP-01		
Depth	32.8	41.5
VC	ND	3.58

DP-11			
Depth	28-30	33-35	39-41
VC	ND	2.7	19.7

WP-05		
Depth	35.9	44.66
VC	ND	ND

WP-13			
Depth	33.0	36.5	43.0
VC	2.13	0.98 J	ND

WP-11		
Depth	36.0	43.0
VC	26.3	ND

WP-10		
Depth	35.9	39.9
VC	5.83	2.59

DP-04			
Depth	26-28	34-36	38-40
VC	ND	3.3	5.7

WP-12			
Depth	25.0	30.0	35.4
VC	ND	ND	ND

WP-14			
Depth	33.0	35.8	42.0
VC	21.02	20.8	1.43 J

WP-16					
Depth	33.0	36.5	42.0	46.0	47.4
VC	2.21	1.51 J	1.15 J	0.60 J	ND

WP-03			
Depth	37.9	41.1	44.8
VC	ND	ND	ND

N

LEGEND

- MONITORING WELL
- PREVIOUS DIRECT PUSH SAMPLE LOCATION
- EXTRACTION WELL LOCATION
- SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- RESIDENTIAL WELL
- PROPERTY LINE
- FENCE LINE
- DNAPL CONTAINMENT AREA
- SVE AREA
- VINYL CHLORIDE ISOCONCENTRATION (2 MICROGRAMS PER LITER)
- WESTERN DELINEATION BORING
- PIEZOMETER LOCATION
- WATERLOO^{APS} (WP) BORING LOCATIONS
- 19.9 MAXIMUM VINYL CHLORIDE (VC) DATA (ug/L)

NOTES:

1. ALL RESULTS ARE IN MICROGRAMS PER LITER (ug/L)
2. ND = ALL SAMPLES NON-DETECT AT THIS LOCATION
3. J = ESTIMATED

APPROX. SCALE (ft.)

0 180

AERIAL PHOTOGRAPH OBRAINED FROM GOOGLE EARTH.

INVESTIGATION RESULTS
THIRD SITE
985 SOUTH U.S. HIGHWAY 421
ZIONSVILLE, INDIANA

ENVIRON

FIGURE 3

DRAFTED BY: APR | DATE: 9/22/14 | 21313651

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Attachment 3

Administrative Record Index

ATTACHMENT 3

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
THIRD SITE
ZIONSVILLE, BOONE COUNTY, INDIANA

ORIGINAL
MAY, 2016

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	211263	10/10/00	Environ International Corp.	U.S. EPA	Engineering Evaluation/Cost Analysis (EE/CA)	484
2	211266	5/11/01	McAteer, M., U.S. EPA	Muno, W., U.S. EPA	Enforcement Action Memorandum re: Determination of Threat to Public Health and the Environment and Selection of Non-Time Critical Removal Action at the Zionsville Third Site	20
3	926175	2/1/02	Hendrickson, E., et al., *Applied and Environmental Microbiology*	File	Journal Article: Molecular Analysis of Dehalococcoides 16S Ribosomal DNA from Chloroethene-Contaminated Sites throughout North America and Europe	12
4	169265	11/21/02	Muno, W., U.S. EPA	Settling Respondents	Administrative Order by Consent Pursuant to Sections 106 and 122 of CERCLA	181
5	926170	3/1/04	U.S. EPA Office of Solid Waste and Emergency Response	File	In Situ Thermal Treatment of Chlorinated Solvents - Fundamentals and Field Applications	145
6	926173	6/7/06	Baker, R., TerraTherm, Inc.	File	Presentation re: In-Situ Thermal Remediation of Soil Contaminated with Organic Chemicals	35

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
7	926176	8/10/06	Lu, X., et al., *Water Research*	File	Journal Article: Relationship between Dehalococcoides DNA in ground water and rates of reductive dechlorination at field scale	10
8	926169	2/15/07	Gavaskar, A., Bhargava, M., and Condit, W., Battelle	Naval Facilities Engineering Service Center	Final Report - Cost and Performance Review of Electrical Resistance Heating (ERH) for Source Treatment	133
9	926178	3/10/08	Bowen Engineering Corp.	Environ International Corp.	As-Built Drawing for Piezometer	1
10	926177	11/15/08	Lu, X., et al., *Enviornmental Pollution*	File	Journal Article: Comparison of an assay for Dehalococcoides DNA and a microcosm study in predicting reductive dechlorination of chlorinated ethenes in the field	7
11	926182	8/27/13	Gremos, A., Environ	Ohl, M., U.S. EPA	Email re: Response to Questions on DHC Sampling and Analysis Plan	7
12	486183	4/10/14	Environ International Corp.	U.S. EPA	Vadose Soils Excavation Completion Report - SVE Area 2	229
13	486186	11/5/14	Environ International Corp.	U.S. EPA	Vadose Soils Excavation Completion Report - SVE Area 2 (Revision 1)	242
14	486187	11/5/14	Environ International Corp.	U.S. EPA	Vadose Soils Excavation Completion Report - SVE Area 2 (Revision 1) - Appendix III - Soil Analytical Reports	1205
15	486185	11/14/14	Environ International Corp.	U.S. EPA	Supplemental Data Collection Report - Dissolved COC Plume	341
16	486184	11/17/14	Environ International Corp.	U.S. EPA	DNAPL Containment Area Supplemental Data Collection Report	545
17	926179	5/20/15	Analytix Technology	File	Safety Data Sheet for AN-975	11
18	926167	6/9/15	Gremos, A., Environ	Ohl, M., U.S. EPA	Technical Memorandum - Response to USACE Email Dated May 20, 2015	46

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
19	926174	7/10/15	Bowen Engineering Corp.	Environ International Corp.	As-Built Drawings for Extraction Well	17
20	926165	7/27/15	Gremos, A., Environ	Ohl, M., U.S. EPA	Technical Memorandum - Efforts to Increase the Performance of Third Site's Pump and Treat System	2
21	926186	7/31/15	Gremos, A., Environ	Ohl, M., U.S. EPA	Email re: Third Site Groundwater Data (With Attached Maps and Tables)	11
22	926171	10/15/15	Bernstein, N., N.W. Bernstein and Associates	Ohl, M., U.S. EPA	Email re: Response to EPA Comments on the Memorandum for Third Site	10
23	926172	10/29/15	Bernstein, N., N.W. Bernstein and Associates	Ohl, M., U.S. EPA	Email re: Third Site Letter and Schedule	7
24	494939	2/2/16	Bernstein, N., N.W. Bernstein and Associates	Ohl, M., U.S. EPA	Letter re: Proprietary and Confidential Business Information - ERH Submissions by TRS Group Inc., McMillan-McGee Corp., and SeaLand Enviro Corp., LLC (***Document withheld due to CBI claim***)	67
25	926185	4/1/16	Environ International Corp.	File	Table 1: Preliminary Evaluation of Remedial Alternatives - DNAPL Containment Area	1
26	926166	4/5/16	Gremos, A., Environ	Bernstein, N., N.W. Bernstein and Associates, and Racher, P., Plews Shadley Racher & Braun	Technical Memorandum - Soil Resistivity Testing, Hardness and Total Iron Sampling in Groundwater - DNAPL Containment Area	46
27	926168	4/11/16	Gremos, A., Environ	Ohl, M., U.S. EPA	Monthly Progress Report for March 2016	9
28	-	-	Ohl, M., U.S. EPA	Ballotti, D., U.S. EPA	Amended Enforcement Action Memorandum - Request for Approval of a Change in Scope of Response Actions for the Non-Time Critical Removal Action at Zionsville Third Site Zionsville, Boone County, Indiana, Site ID # 05HM (***PENDING***)	-